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Personal Identifier System and Method

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Abstract

A system and method of unique personal identifier that can be generated de novo by one or a plurality of professionals, working incommunicado and separated by time and space, based on information that can be readily supplied by the patient or client, informant, governmental records or birth certificate – with the resultant key generated being the same and unique for that person enabling the cross-referencing , retrieval and merging of data collected pertaining to that person in a health care or non-health care context.

The integrity of the personal identifier of this invention is ensured by continual professional verification at the service delivery level. A system and method of resolving non-unique keys is also discussed. This invention allows the professional/ health care practitioner or his staff to generate a unique patient identification key suitable for personal healthcare informatics and/or knowledge management purposes (such as crime fighting bureau) regarding a person living or deceased, based on data that the person, or his relatives, or an extract of a birth certificate, or historical records can provide. Data of a personal and geographical nature embedded in person health id will also aid in public health research and personal healthcare. Personal ID keys so generated by a plurality of health practitioners / governmental bureaucracies will enable the sharing

of data/ medical record transactions. If properly implemented will guarantee that no two nationals in a country will ever have the same LID which is a personal/patient health Identifier key. A unique personal identifier for each person born on this earth both living and deceased is helpful for knowledge management concerning that person and is applicable for function such as implementing universal personal ID system , personal web site/email address and for tracking data for knowledge management such as for law enforcement purposes. It will also stem the tide of personal ID theft.

The problem

The patient in a modern society has ample access to a multitude of care providers, which may comprise several family doctors, several pathology and radiological laboratories and several medical specialists. Healthcare is expensive and duplications of tests, drugs, procedures and sequestration of patient health data by individual healthcare provider will inevitably lead to wastage and sub-optimal care. Synchronisation of distributed medical data can only be promoted by a unique patient identifier, but unfortunately each health care provider generates its own unique identifier and has its own method of transactional representation. At each site of care, recording of patient data occurs, this data being usually stored in a computer database. At each site, data pertaining to a particular patient is assigned a unique patient identifier that is unique to that particular healthcare organization. Healthcare in the 21st century is about universalisation, collaboration, aggregation and translation of medical data pertaining to a particular patient across all geographical and care-provider boundaries – to make the health data available anywhere at any time to accredited care providers. A significant problem, then, is the lack of a provider-verifiable universal patient identifier for tagging transactions, to which the proliferation of Medicare care card numbers bears testament.

The government in Australia, as in other jurisdictions, is unwilling or unable to introduce a nationwide unique patient identifier for the specific purpose of inter-operability and transportability of partial or whole medical records/transactions across the various healthcare sectors. The Docle coding system, based on the biological Linnean classification system, is the most widely used coding system in general practice in Australia(>15,000 GPs). The Docle paradigm acts a powerful filter for problem solving

in this particular domain. The present invention includes a system and method of patient unique identifiers based on Linnean Classification and geographical information– which can be supervised by the various general practitioner divisions under the auspices of the RACGP/ADGP – providing the foundational backbone for an effective de facto national unique patient ID system.

The system below is a prior art attempt by the author to solve the patient identifier problem.

The method and system of the invention addresses the problem of a lack of unique patient identifiers. A lack of unique health identifiers have resulted in data islands in the healthcare scene. A dependence on national medical care numbers (eg Medicare numbers or NHS numbers) is unreliable, as such numbers are very difficult to readily verify, consisting only of code numbers/characters. Increasing use of Medicare numbers has lead to greater entropy in the healthcare system. Studies by the inventor have concluded that a solution to the problem of patient identifiers should involve the participation of general practitioners, in conjunction with the appropriate administrative bodies to provide the key services of verification and maintaining the integrity of the system. In the first instance, a patient can choose to opt out of the system, in which case the uniqueness of these patient keys is resolved through the levels of the appropriate administrative bodies. The system and method relies on naming rather than assigning strings of digits to a particular individual patient.

Patient (species) naming conflicts are resolved by using the typical biblical naming series found in Matthew 1:2 where is found the name series of "Abraham was the father of Isaac; Isaac was the father of Jacob; Jacob was the father of Judah; Judah was the father of Peroz...(Tamar was his mother)..."

Naming conflicts, in the event that there were many of the name Perez in the particular community at that particular historical period, this can be resolved by naming this particular Perez as:

perez_s_judah_tamar_jacob_isaac_abraham where s means son of.

The framework of the linnean Docle paradigm of unique patient identifier views each patient as a unique individual requiring a species name.

In the Docle classification framework there are primary, secondary and tertiary keys: e.g. diabetesMellitus is a primary key, while the secondary key is diabm and the tertiary keys which are really aliases, such as "sugar_diabetes", or simply "diabetes". In the proposed linnean ID system, the primary key for a given individual is yet to be developed at his time, and when a national Patient ID is implemented, the linnean ID can be its secondary key. Alternately this linnean key can be nominated the primary key.

The linnean ID key incorporates the elements of first name, a computed number derived from the date of birth, the sex, the first names of father and mother and the first name of previous issue of either parents and the geographic location of birth designated by longitude and latitude. Given a hypothetical individual example, Robert was born on 17 mar 1988 with father David and mother Alyce and registered by his family doctor He will be classified with the species name of:

robert31852s@david@alyce.020606.vic.au

the derivation of key being from:

[first name at birth] [date of birth as expressed as number of days from 1 jan 1901] [s|d] "@" [firstname of father] "@ "[first name of mother] "."
dateRegistration [state] "."[country]

dateRegistration = yymmdd format

This system is suitable for women who wish to change their surnames on marrying.

The s| d option signifies 's' for son of, and 'd' for daughter of.

A family GP is the 'registrar' of a particular key, responsible for the integrity and custodianship of the Linnean ID system. The GP duties include sighting original documents, generating the Linnean ID, and educating the patient with regard to the Linnean ID. Verification of patient identity is a responsibility GPs are traditionally used to. If appropriate, use of the identifiers can involve a small reward for each patient registration of the Linnean ID key, to both doctor and patient, due to the savings generated from increased efficiency of process arising out of this use.

In the extremely rare event that there is another individual with the same administrative data as Robert in that same division, then the key is simply resolved on the following registration day:

robert31852s@david@alyce.020607.vic.au

The division collects information in a data table (a relational database) comprising only three fields: the Linnean ID key, the attribute of the registrar (the provider number), and the national medical care number (eg Medicare number) of the patient (if available). Before a new Linnean ID is created , a check is made on the national database for duplication of ID. For example if another GP in the Dandenong division attempts to enrol Robert, the national database check will indicate that Robert is already enrolled in the Knox division via information regarding Medicare number and date of birth.

The system is designed to maintain full integrity. The database at the general practitioner divisional level can be uploaded to a regional divisional office (eg the state divisional office). Duplicates are detected by looking for records with the same date of birth-computed number, and the same medical number, as well as by other checks. Intentional and unintentional risks of system corruption can be detected by a doctor unable to match pathology results and hospital discharge notes. In this way, patients can be taught to value the advantages of a safe and accurate ID that has as its sole aim improved health outcomes. The integrity of the system is maintained by constant use, and dubious Medicare numbers will be exposed by such use.

Currency and integrity of each key can be certified periodically by the GP or approved health care provider.

The system deals with Linnean ID key deprecation in this way. The division at national level constructs a table of deprecated keys, being keys that will never be used again. Each deprecated key will point to the current Linnean ID. Doctors and patients involved in any key deprecation are informed by the division. The system is thus designed to withstand key deprecation.

The following gives further information on the Linnean classification of patients:

kingdom: objectMedica

phylum: tamtap

genus: robert^ 33679^ s^ d^ father@david^ mother@alyce^ 020606.vic.au^

species: robert31852s@david@alyce.020606.vic.au

Comment: the Linnean Id belongs to the polygenera of : robert^ 33679^ s^ d^ father@david^ mother@alyce^ 020606.vic.au^

The Linnean ID system will pick up most if not all incongruencies in entries. The enhanced reliability and efficiency of the system will tend to encourage buy-in from all stakeholders in the medical community. It is commonly understood that 20% of our patients make more than 80% of healthcare demands. If the system can concentrate on the healthcare needs of this 20 percent, and demonstrate the fairness and integrity of the system, the rest of the population will buy in.

Analysis of strength and weaknesses of above system:

The above system suffers from the weakness of the variable date of registration and the lack of usefulness of data related to the location of registration process. The other weakness is the reliance on a central authority to act as a referee to guarantee the uniqueness of the patient Linnean identifier key. In this invention the reliance on a central authority to warranty the uniqueness of the key is dispensed with. This invention comprises means for any doctor, general practioner, specialist or health worker to work in complete autonomy at any time or space to compute and derive the same unique patient linnean identifier key based on data that is easily obtained from patient or informant or is held in the modern birth certificate. The improvements are enhancements to the above linnean system and allows the clinician or his support staff to issue a unique patient identifier key with confidence and zero reliance on a central control authority.

Improved system and method of personal Linnean ID system of this invention

The method below uses a previous issue of parent and geographical discriminator . This method allows doctors working in disparate locations / time and incommunicado to generate the same identifier keys and solve the data island problem. The derivation of key being from:

> [first name at birth] [date of birth as expressed as number of days from 1 jan 1901] [s|d] "@" [first name of father] "@ "[first name of mother] "@" [first name of previous_issue _of_parents] [latitude of place of birth] [longitude of place of birth]

first name of previous issue of parents = name of your youngest older brother or sister, either mother or father side - or as the case maybe same father and mother . In the case of say a family of 5 children with same father and mother (both with no other child(ren) from other relationships) enumerated from eldest to youngest: Jack, Jill, John, Jerry and Jeremy: the previous_issue_of_parents of John is Jill and the previous issue kin of Jeremy is Jerry and the previous issue kin of Jack is nil.

For example:

The scenario of Robert was born on 17 mar 1988 with father David and mother Alyce. Robert is the first born of both David and Alyce. Robert was born in Geelong, Australia which has the geographic location of latitude 38.08 south and longitude 144.21 east . He is being registered by his family doctor in the following manner :

The doctor/staff member will type in the following registration screen:

REGISTRATION SCREEN

first name: Robert

surname: Oon

middle name: Tongsheng

fathers first name: David

mothers first name: Alyce

birthday: 17 mar 1988

sex: m

kin first name – previous issue of parents: nil

location/town: Geelong

On clicking "register" the computer program will ignore the surname and middle name; will compute that 17 mar 1988 is 31852 days since 1 Jan 1900.

The computer program will lookup Geelong in its geographic database and return the string comprising latitude and longitude to degress and minutes in precision.

38.08s144.21e

He will be classified with the species name of:

robert31852s@david@alyce38.08s144.21e

The occurrences of just 2 @ characters indicates that Robert above is the first or eldest child of both Alyce and David.

I n the hypothetical example of Robert being actually the second child and that he has an older sister named Nicole, with all other data unchanged, then the key would be:

robert31852s@david@alyce@nicole38.08s144.21e

In another embodiment, which is the preferred default system and method, for the GPS location of birth, only the graticule readings apply. That is using the longitude and latitude with degrees data only without the minutes and seconds data.

the concept of graticule of dimension 1degree latitude by 1 degree longitude is used. Everyone born in this world is geographically linked to a particular graticule on this earth. A graticule varies from a maximal size of 111km by 111 km at the equator area to

an area less that 100 by 70 km near the pole. A graticule is a grid of meridians and parallels derived from a particular projection, used in drawing the map. The system used is based on modern map making predicated on the system of 1) latitude with the equator being zero degrees and latitudes are designated as north or south of the equator. Near the equator each degree change is about 111 km 2) longitude based on the Greenwich meridian being zero degrec and that meridians are designated as degrees 0 to 179 east or west – where 180 degree east is equivalent to 180 degree west. The meridians get squeezed together at the poles, hence graticule . Any location in the world can be assigned a graticule defined by the latitude and longitude expressed as degrees but without the minutes or seconds. For example Melbourne geographic position is 38.08S 144.21E, hence is graticule is defined by latitude in the range 38.0.0 S to 39.59.59S and longitude 144.0.0E to 144.59.59 E

Hence in the above example of Robert above, without any older sibling, using the graticule concept:

robert31852s@david@alyce38s144e

and in the case that with Nicole as the immediate older sister:

robert31852s@david@alyce@nicole38s144e

Guarantee of uniqueness of patient LID.

There are at least 2 ways of avoiding non-uniqueness of patient Linnean identifier.

While the chances of a non-unique key are close to zero, a system to ensure uniqueness can be effected at the registry of birth level. All birth certificates that are issued at the state level have to pass the patient LID test before they are issued. It is extremely unlikely but in the era of electronic record keeping of births, the overhead is almost zero

, while registry of birth is at it , it might as well compute the patient LID and stamp it on the extract of the registry of birth .

In the event of a patient LID conflict, there are a number of ways of resolving the naming conflict. Parents are informed that registration is on a first in best dressed system. In one scenario the registry of birth can act like an internet domain registry and scoff at the parents for daring to register their baby with a patient LID that is already taken and threaten them with removal of privileges if they do not get a valid LID. Rewards must not be given to induce parents to change their baby name to avoid naming conflicts as this will lead to rorts.

The easier way is to get a more accurate GPS (Geographic Positional System) expressed in degrees, minutes and possible seconds if need be to avoid key conflict.

For example the key below, in the remote possibility that it may be non unique :

robert31852s@david@alyce@nicole38.08s144.21e

can be resolved by a more accurate GPS system to resolve the location of the hospital/suburb of the confinement centre may generate a more detailed key utilising seconds information for the GPS such as:

robert31852s@david@alyce@nicole38.08.44s144.21.12e

Note: each second change in a longitude and latitude graticule in the Australian subcontinent of say 100km X 100km approximates to 100/60 or 1.66 km – a distance that is enough to distinguish the different location of two hospitals that are set more than 2 km apart.

System and method.

The graticule system is preferred solution as the data needed to generate the patient LID can be provided by a conscious patient/informant without to recourse to look up birth certificates/document. Use of geographic information utilising minutes and seconds are

required only to resolve key conflicts. Most atlases give conflicting minute readings for GPS refernces for big cities. Where is the centre point of a big city like New York or Beijing. The GPO as a refercnce point may be fraught with doubt. The general post office (GPO) in a city may be destroyed and redeveloped as a commercial centre. So when a client says he is from Calcutta, it is better to use the graticule (in degrees only) from Calcutta rather than a longitude and latitude reading with both degrees and minutes from a reference atlas/list. Longitude/latitude readings in degrees, minutes and seconds may be used to resolve problem of uniqueness of keys OR in instances of birth certificates contain precise GPS locations and the use of minutes and seconds is mandated by government for purpose of public health in locating more precise location of birthing centres for epidemiological reasons.

The view of the General practitioner is that of a "gate keeper" to prevent wasteful access of the health system. In this proposal, the general practitioner, in providing the registration and verification services needed – becomes the goal scorer in a national ID system.. A universal patient id, compliant with all aspects of current (and designed to cope with future) privacy legislations, is needed in the relentless pursuit of quality, equality and efficiency for best patient population outcome - in a healthcare system with limited resources. Grass roots verification provided at the professional service level, with the aim of benefiting patient by not losing health data, will lay the foundation for a system of identity of the highest integrity. A system of integrity which may be called upon for the service of the nation in the event of that need.

The graceful degradation of medical transaction

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Abstract

Computerising the medical transactions can create a gold mine for epidemiological research if each and every medical transaction carries with it, two instances of embedded GPS information. The two GPS locations of interest being 1) the location of birth of the patient and 2)the location of current illness/health contact as represented by the location of the provider. In DocleScript transactions, which are typically held in a SQL database, these data are embedded in a transparent manner in the patient identifier.

In the DocleScript propositional recording system, the location of birth-GPS data of the patient is embedded in its Connectionless Universal Patient Identifier (CUPID). Cupid also incorporates embedded data relating to date of birth, sex, first names of parents, birth order among other data. In the DocleScript medical recording system, all medical transactions are based on the concept of propositions. A proposition is the reification of the meaning of a declarative statement on the patient's health and administrative status. Included in any DocleScript medical proposition, besides the CUPID, is an author field with a provider number with a concatenated GPS location after the apropos character. For example provider 77777FX located in Geelong would be 7777FX@11.34n144.55e. Provider GPS locations with 1 second difference, depending on the latitude, will translate to a distance of approximately 1.6 km, a suitable order of magnitude to pinpoint a suburban salmonella epidemic. While GPS locations with degree of accuracy to 1/60 or 1/100 of a second will be able to pinpoint specific birth centres and would be ideal for perinatal research. With these embedded GPS data, detection of unusual epidemiologic phenomena, instances of doctor shopping and other systematic abuse of the health care system would be facilitated.

It is a given that a standardized medical transaction has to include a universal ID key and an author key for purposes of remoting and reaggregation. By persuading/mandating the use of embedded GPS data in the Patient ID key such as in the CUPID system, and the incorporation of GPS data in the author key, we would have come a long way in

unlocking the gold mine within the electronic health record to the public health researcher.

In another scenario this GPS aware CUPID key is used for cross-matching the compatibility of two medical records, with a probabilistic score, before they are merged. This cross matching of the CUPID patient identifiers is a classic example of its "graceful degradation" attribute in that a small error in the CUPID patient identifier does not lead to rejection of the transaction but evokes a "immunologic" type system response to attempt to correct the defect.

An example of two cupids:

1) yeong19191s@thean@sook@yong12n144e

2)yong19191s@thein@seok@yong12.44n144.12e

would be processed with a CUPID cross-matcher which would output score of 82 out of 100 for degree fit. Heavier weightings can be placed on date of birth and geographic location of birth while minor spelling errors in relation's first names are better tolerated.

While the foloowing two cupids:

1) yeong19181s@thean@sook@yong12n144e

2)yong19191s@thein@seok@yong12.44n144.12e

would attract a score of only 14 as the date of birth misses the mark.

By using the CUPID cross matcher the system will present the likeliest candidates that can lay claim to the imported transaction – to be followed by human eye verification.

CLAIMS

1.A unique person identifier system and method that can be generated de novo by professionals incommunicado and separated by time and space , based on the information can be readily supplied by the patient or client, informant, governmental records or birth certificates ; is predicated on first names of the person, the father, the mother and if applicable the first name of previous issue of either parent, a computed date of birth, sex and a geographical location expressed in longitude and latitude - with the same identifier key being generated, to allow merging of data collected regarding that person in a health care or non- health care context.

2. The personal identifier system and method that comprises means to resolve uniqueness of identifier by expanding on that component of identifier relating to geographical positioning system, through extending the graticule by the incorporation of minutes and if need be, seconds data to the identifier.

3. System and method to allow cross-matching of connectiottless universal patient identifier for degree of match, allowing for graceful degradation, and comprising means for system to rectify the discrepancy in personal identifier by evoking likely candidates who are the real owner of an imported medical transaction.

Glossary

LID – linnean identifier , a unique key to tag patient data such as database transactions and medical files.

GPS – Geographic Positioning System

Enhancements

8 feb 03

- docking based on probabilistic model 6n100e is near fit to 6.32n100.21e

-service location as 6.32n100.21e

-home location of patient is 6.32n100.21e